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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/785,424	02/20/2001	Sung-II Park	8733.401.00	1944

30827 7590 03/27/2003

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EXAMINER

CHUNG, DAVID Y

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/785,424

Applicant(s)

PARK ET AL.

Examiner

David Y. Chung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-28 is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-15 rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano (U.S. 6,292,241) in further view of Nakamura et al. (U.S. 5,691,791).

As to claims 1 and 11, Hirano discloses a conventional reflective liquid crystal display with an embossed acrylic resin layer formed over the TFT and a reflective electrode formed on the acrylic resin layer. Note the prior art device shown in figure 1. The entire surface of resin layer 108 is embossed and has a plurality of random uneven portions. The pixel electrode 109 formed on resin layer 108 also contains random uneven portions so that its surface is embossed.

Hirano does not teach forming the uneven surface of the resin layer by dry etching. Nakamura et al. discloses a reflective liquid crystal display having a reflective electrode formed on an embossed resin layer. Nakamura et al. teaches that the reflectors were formed by patterning a photosensitive resin or by dry etching. Other methods such as sand blasting and wet etching could also be effectively employed.

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See column 22, lines 54-57. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the reflectors of Hirano by dry etching, because it was one of four well known functionally equivalent methods of forming an embossed surface. The purpose of a mask during dry etching was to selectively etch certain portions of a surface. Because the entire surface of resin layer 108 disclosed by Hirano was embossed, it would have been obvious to one of ordinary skill in the art at the time of invention to perform dry etching without a mask.

As to claims 2-4, SF₆, O₂, CF₄ and various combinations of these gases were conventionally used during dry etching processes. It would have been obvious to one of ordinary skill in the art at the time of invention to use SF₆, O₂ and CF₄ during dry etching because of their predictable behavior during the etching process.

As to claims 5 and 12, Hirano discloses an acrylic resin layer formed on the thin-film transistors. See column 3, lines 26-30. Acrylic resin is an organic insulating material.

As to claims 6 and 13, Benzocyclobutene was widely used for the passivation layer in liquid crystal devices because of its excellent transmission of visible light. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use Benzocyclobutene for the passivation layer because of its excellent light transmission.

As to claims 7, 8, 14 and 15, reflective electrodes were typically formed of aluminum because its high reflectivity led to a brighter display. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form reflective electrodes of aluminum in order to make a brighter display.

As to claim 9, the contact hole in the passivation layer was inherently formed prior to forming the reflective electrode. This was necessary in order to connect the reflective electrode to the source electrode of the thin film transistor.

As to claim 10, Hirano is silent as to whether the contact hole in the passivation layer is formed before or after embossing the surface. However, both methods were well known functionally equivalent alternatives for manufacturing this type of reflective display. It would have been obvious to one of ordinary skill in the art at the time of invention to form the contact hole before embossing the surface because it was one of two well known functionally equivalent methods of forming this type of reflective display.

Response to Arguments

Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.


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Claims 16-28 allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Chung whose telephone number is (703) 306-0155. The examiner can normally be reached on Monday-Friday from 8:30 am to 5:00 pm.


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David Chung
GAU 2871
03/22/03